

Melpomene anazalea, a New Species of Grammitid Fern (Polypodiaceae)

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ABSTRACT.—A new species of grammitid fern, *Melpomene anazalea* Sundue & Lehnert from Colombia, is described and illustrated. It stands out in the genus for its particularly small size and abundantly setose lamina. It is known from protected rock crevices in relatively dry páramos.

KEY WORDS.—Andes, Colombia, dry páramo, *Melpomene peruviana*, *M. pilosissima*

The grammitid ferns are a monophyletic group within the Polypodiaceae (Schneider *et al.*, 2004) and comprise about 750 species with a pantropical – southern temperate distribution (Parris, 2003). They are predominantly small plants exhibiting epiphytic and saxicolous habits (Parris in Kubitzki and Green, 1990; Parris 2001, 2003; Smith in Moran and Riba, 1995). *Melpomene* is characterized by having ventral root insertion, reddish brown clathrate scales with apical and sometimes also marginal gland-like cells, hydathodes without calcareous deposits, and is distinguished from other grammitid genera by having secondary metabolites with a distinctive sweet and spicy odor (Smith and Moran, 1992). While the circumscription of several genera within the grammitid ferns has been called into question by the phylogenetic analysis of Ranker *et al.* (2004), further studies continue to support the monophyly of *Melpomene* (Lehnert *et al.*, in press). Many recent field trips and herbarium studies have yielded more species new to science (Labiak, 2000; Rojas, 2001) like the one presented here, which was discovered by MS while conducting field work in Colombia.

Terminology follows that of Lellinger (2002). Grammitid ferns are beset with two types of laminar indument that appear to be distinct and not part of a homologous series. The term “seta” has often been applied to the stiff, darkened hairs that frequently occur in grammitid ferns including *Melpomene* (Smith and Moran, 1992; Labiak and Prado, 2005). The same treatments used the term “hairs” for the paler, often branched trichomes found mainly on young petioles and rachises in *Melpomene*. However, we find that variation occurs within the “setae” of *Melpomene*, sometimes representing species

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autapomorphies and sometimes reflecting different growth conditions. For example, the “setae” of *M. firma* (J. Sm.) A. R. Sm. & R. C. Moran are usually quite short and patent. For this condition the term “acicular hairs” would be more fitting. In *M. flabelliformis* (Poir.) A. R. Sm. & R. C. Moran and many related species, the “setae” are sometimes flaccid and twisted. Such trichomes are better described as “ciliform hairs” (Lellinger, 2002). For the stiff, straight trichomes or “setae”, the term “setiform hairs” is available (Lellinger, 2002). Furthermore, used in Latin diagnoses, the term “seta” would translate as “bristle” (Stearn, 2004), which is a notably different structure (Lellinger, 2002) that is not found in *Melpomene* or other grammitid genera. We prefer the terms “acicular,” “ciliform,” and “setiform hairs” to describe the simple pluricellular trichomes that are usually dark red in color with acute tips, and “clavate hairs” for the minute simple and branched, pluricellular hairs that are pale in color and bear clavate cells at their apices or along their length. This second type of hair has been referred to as “glandular” (Parris, 2005) and appears to be homologous to the secretive gland-bearing branched hairs of *Zygophlebia* (Bishop, 1989), but in the course of our studies, we have not observed a secretive nature in the hairs of *Melpomene*.

Melpomene anazalea Sundue & Lehnert, *sp. nov.* TYPE — COLOMBIA.

Boyacá: Municipio Chisacá-San Pedro de Iguaque, SFF de Iguaque, sendero subiendo a la laguna de Iguaque, 05°41'3.1"N, 73°26'22.2"W, 3536 m, 30 Apr 2007, Sundue & A. Vasco 1290 (holotype: NY; isotypes: HUA, UC). Figs. 1, 2.

A *Melpomene peruviana* (Desv.) A. R. Sm. & R. C. Moran statura minore (laminis 1.0–3.7 × 0.2–0.3 cm vs. 1.5–8.5(9.0) × 0.4–1 cm in *M. peruviana*), pilis setiformibus in pagina superiore crebris (vs. absentibus), in pagina inferiore aequaliter distributis (vs. in soris confertis) differt.

Plants saxicolous, growing in moss layers and rock crevices (Fig. 1). *Rhizomes* short-creeping, horizontal (Fig. 2A), frequently branched, 0.4–0.5 mm diam. *Fronde*s 1.3–4.7 cm long, appressed to substrate, inserted onto the rhizome at acute to right angles, closely to moderately spaced (1.5–3.0 mm). *Scales* 3–4 × 0.3–0.4 mm, 6–10 cells wide, clathrate, dark brown, iridescent, narrowly cordate at the base, attenuate at the apex (Fig. 2B); apical gland-like cells 1–4, linearly to furcately arranged (Fig. 2C). *Petioles* 3–10 × 0.2–0.3 mm, proximally terete, distally marginate, with few to many, dark brown, setiform hairs, 1.3–1.5 mm long, spreading, simple and branched clavate hairs present on crosiers and persistent on older fronds, 0.2–0.4 mm long (Fig. 2D). *Rachises* castaneous to blackish, planar and slightly sunken adaxially, hemispherically protruding abaxially, with scattered setiform hairs on both the abaxial and adaxial sides, the setiform hairs 1.0–1.5 mm long, spreading, dark brown, the abaxial side of the rachises also provided with scattered simple and branched clavate hairs. *Laminae* 1.0–3.7 × 0.2–0.3 cm, linear to narrowly elliptic, the bases cuneate, the apices acute, 1-pinnatisect throughout, with 10–20 pairs of segments; segments oblong, fully adnate, the bases slightly decurrent, the apices rounded, the costae not visible (Figs. 2E,

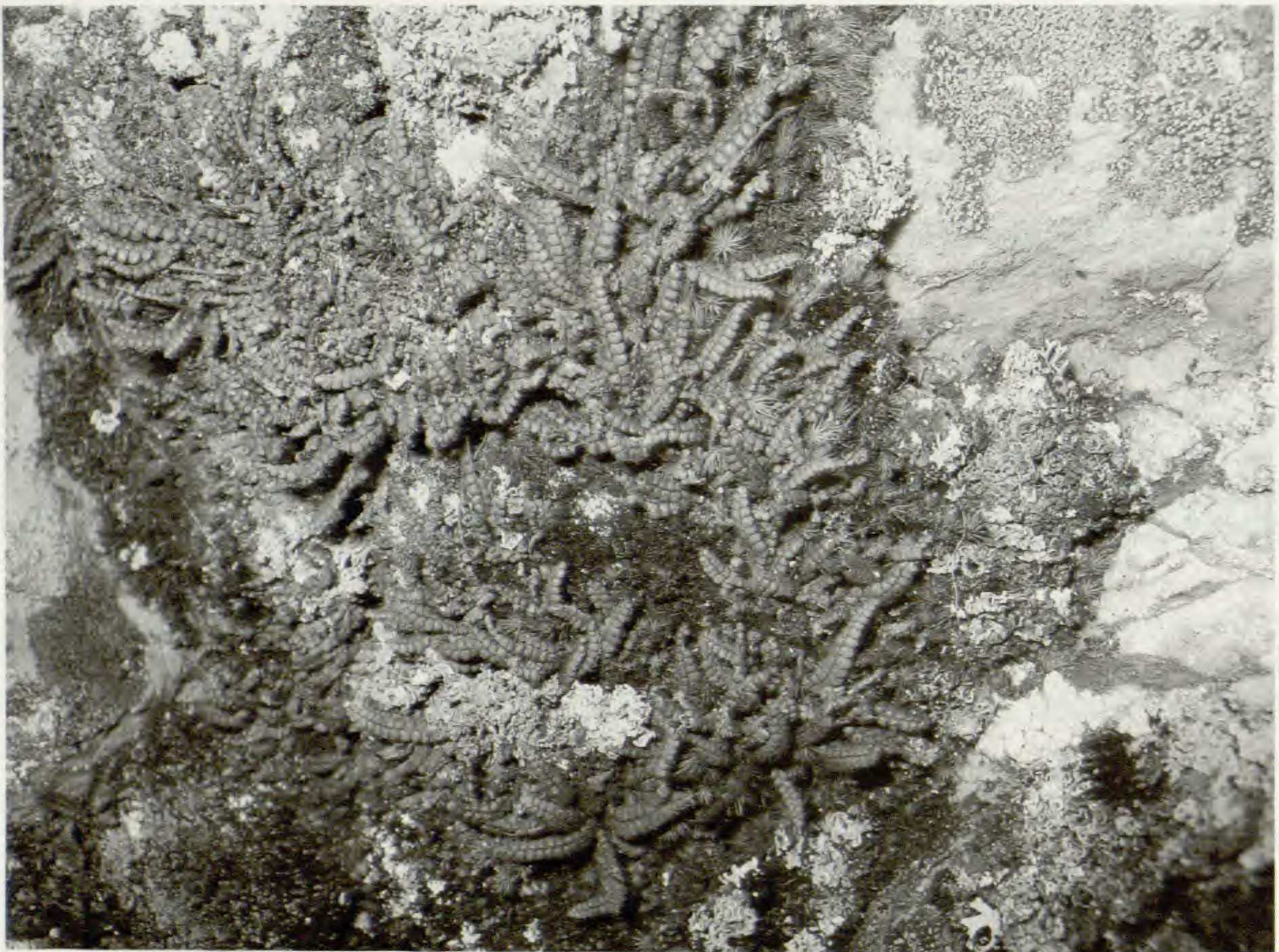
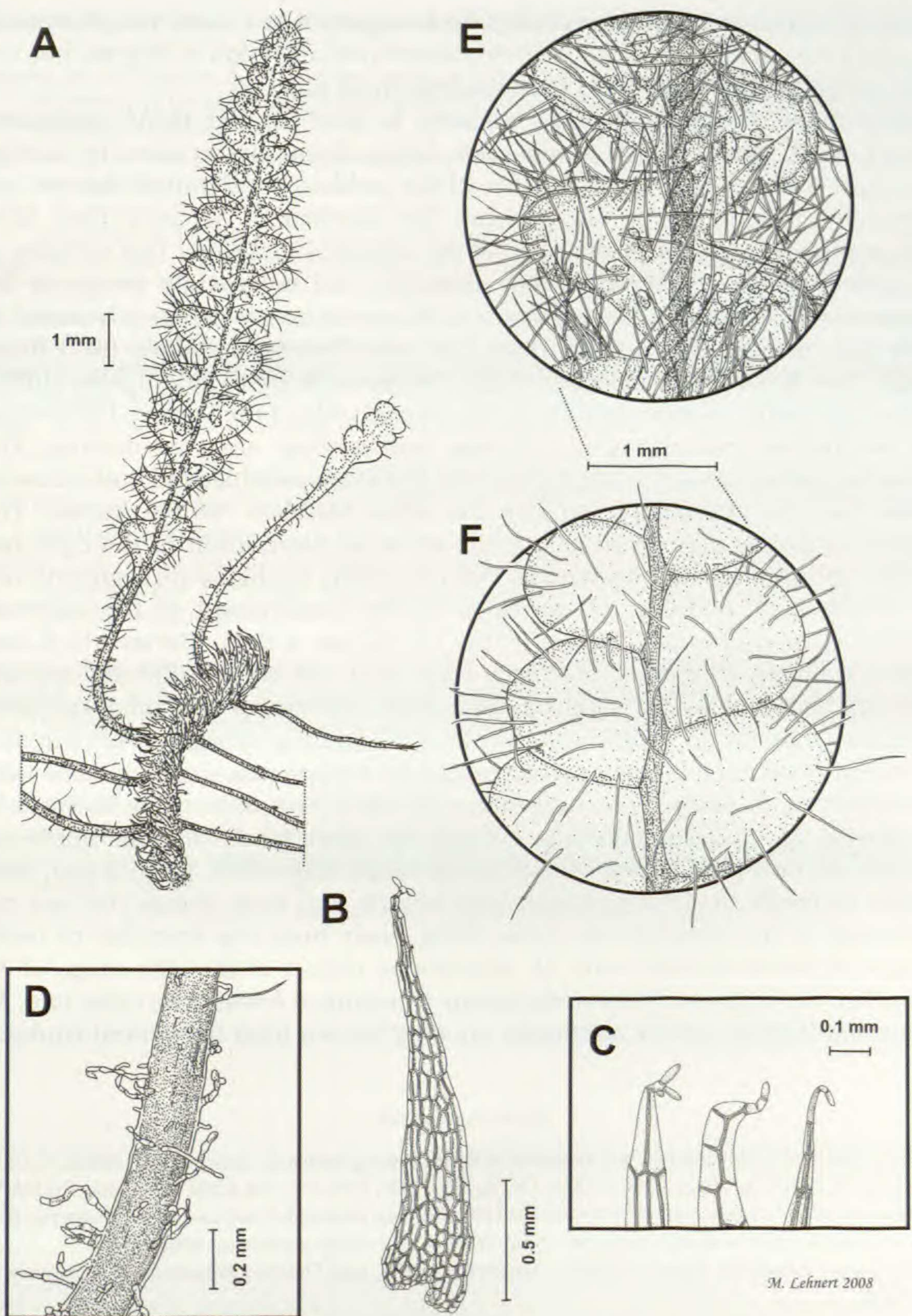


FIG. 1. *Melpomene anazalea* growing in rock crevices. Photographed at the type locality. Photograph M. Sundue.

F); 1–2 proximal segment pairs usually markedly smaller than subsequent segments, and with the base more strongly decurrent, the abaxial and adaxial surfaces of the lamina as well as the segment margins densely provided with dark brown setiform hairs, 1.0–1.5 mm long, spreading (Figs. 2E, F), the abaxial surface of the lamina also provided with scattered simple and branched clavate hairs; stomata not visible; hydathodes present, small and inconspicuous; sori 1–3 per segment, confluent at maturity, with setiform hairs like those of the laminae (Fig. 2E).

The name refers to the drought resistance of the species (Greek *an-* = not; *azaleos* = dry).

This minute and distinctive species is known only from a single collection made in Santuario Flora y Fauna Iguaque in the Cordillera Oriental of Colombia, where it grows on protected rock ledges in dry páramo with *Espeletia* at 3536 m. No further collections were located at either HUA or COL. The SFF Iguaque is situated on the western slope of Colombia's Cordillera Oriental in a region of relatively dry páramos (Rangel-Churio, 2000). Despite being known from a single gathering, we are confident that this plant represents a new species as we know from a revision of the genus (Lehnert, unpublished data) that no comparable specimens are located in the major herbaria of the world (see Acknowledgements) and that no species exist for



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FIG. 2. *Melpomene anazalea*. A. habit; B. scale; C. detail of scale apices; D. petiole; E. segments abaxially, sporangia primordial; F. segments adaxially. All from Sundue & A. Vasco 1290 (NY).

which *M. anazalea* could be mistaken for or regarded as a mere morphotype. It is remarkable that this species, which occurs within 130 km of Bogota, has not been collected and brought to our attention until now.

Melpomene anazalea in many respects is most similar to *M. peruviana* (Desv.) A. R. Sm. & R. C. Moran, but differs from that species by having abundant setiform hairs on both sides of the rachises and laminae that are not clustered in the sori. By comparison, the laminae of *M. peruviana* have setiform hairs clustered in the sori but are adaxially glabrous. The rachises of *M. peruviana* are moderately setose abaxially, and moderately setose on the proximal half adaxially. The segments of *M. anazalea* are commonly round at their tips, whereas those of *M. peruviana* are often more deltate (to 3 times longer than broad) with more acute tips. *Melpomene peruviana* further differs by having readily visible stomata on the abaxial side of the lamina. Otherwise, the similarities concerning morphology and ecology are considerable. The rhizomes and scales of the two species are indistinguishable, and both occur in areas that are apparently too dry for other members of the genus. The appressed fronds may be an adaptation to avoid desiccation in the cold and windy environment of the páramos. With its nearly isodiametric segments and its clearly alate petioles, *M. anazalea* is also reminiscent of the common species *M. moniliformis* (Lagasca ex Sw.) A. R. Sm. & R. C. Moran which was collected nearby (*Sundue & A. Vasco 1288*, NY), but *M. moniliformis* appears virtually glabrous at first sight (shorter, often ephemeral and inconspicuous hairs are common on petioles and in the sori) and has straight, erect fronds.

Adaxially setose laminae are uncommon in *Melpomene*. Other species with this character are *Melpomene pilosissima* (M. Martens & Galeotii) A. R. Sm. & R. C. Moran, *M. huancabambensis* Lehnert sp. nov. ined., and *M. michaelis* Lehnert sp. nov. ined. These species are all much larger than *M. anazalea*, have longer segments (3–5 times longer than broad), and have fronds that are not appressed to the substrate but rather hang freely from tree branches or rocky ledges. Of these species, only *M. pilosissima* occurs within the range of *M. anazalea*, but it grows at lower elevations in montane forests; the other two, *M. huancabambensis* and *M. michaelis*, are only known from the central Andes.

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